# FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

**First Aero Weekly in the World.**

**Founder and Editor: STANLEY SPOONER**

**A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport**

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## Flight,

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**The Index for Vol. XIII of FLIGHT (January to December, 1921) is now ready, and can be obtained from the Publishers, 36, Great Queen Street, Kingsway, W.C. 2. Price 1s. per copy. (1s. 1d. post free).**

## EDITORIAL COMMENT

THE regulations governing the engine competition to be held in France during 1924 have now been issued, and are published elsewhere in this issue of FLIGHT. The total prizes amount to 1,600,000 francs, but out of that foreign competitors can only qualify for 1,000,000 francs. At the present rate of exchange this represents approximately £20,000, and the winning firm would also be drawing royalties on manufacture, at the rate of 8,000 francs per engine for the first 100, 7,000 for the next 100, and so on until the 601st, from which onward there would be a fixed royalty of 2,000 francs per engine. Thus, in the unlikely case of 600 engines being manufactured, the winner of the competition would get the original prize of £20,000 plus 3,300,000 francs (£66,000) in royalties, or a total of £86,000. It is, however, unlikely that any one engine, no matter how good, will be manufactured in France during the next few years to the extent of 600, although even in smaller numbers the royalties will amount to a not inconsiderable sum. There is further the consideration that foreign competitors will be free to sell their engines anywhere outside France, her colonies and protectorates, and thus might, even without winning the competition, possess an engine which would find a ready sale. Taking it all round, the competition offers a distinct encouragement to engine manufacturers everywhere, and we sincreely hope to find among the entrants more than one British firm.

**The French Engine Competition**

As regards the technical side of the competition, there is, we think, not much wherewith to find fault. The regulations appear to be eminently sensible, and there is little doubt that more than one engine will be produced which is capable of fulfilling the conditions in a creditable manner. Even present-day engines, with minor modifications, should be able to make a very good showing. The size of engine which it is hoped to encourage—350 to 450 h.p.—appears to be one well suited to commercial demands for several years to come, and we are glad to see that those responsible for the framing of the regulations have not asked for engines of much higher power. It will be a good many years before we are likely to require single units of much higher power than about 400 h.p.

The weight limit, 7·26 lbs./h.p., including fuel and

oil for five hours, is fairly generous, and there is more than one British engine in existence today which should be able to score considerably on the weight allowance. It we take the weight per b.h.p. as about 2·25 lbs. and the fuel and oil consumption as ·65 lbs./h.p./hour, the total weight works out at 5·5 lb. per h.p., leaving a margin of 1¾ lbs./h.p. As the weight of the cooling water is not, apparently, taken into account, except such as remains in the water jackets, water pump and piping after the five hours' run of the acceptance test, the figure of 7·26 lbs./h.p. should not be difficult of attainment.

The actual endurance tests, 30 periods of 8 hours each, not extending over more than 100 days, are stiff, but not unduly so, and it will be possible to run the engine for one period of 8 hours and then give it one or two days' rest, and still be within the limit of 100 days. This is, apparently, the procedure which is aimed at, as there does not appear to be any marks awarded for completing the endurance tests in less than the 100 days.

The system of penalties appears, generally speaking, to be good. The renewal of such parts as plugs and valves is not heavily penalised, and is not subject to cumulative penalising, as are certain other parts. In other words, parts which are known to require attention, renewal or repair in any engine are treated rather lightly, while certain accessories and important engine parts are severely penalised, especially if breakage occurs repeatedly. On the whole the penalties given suggest that it has been the object of those framing the rules to attempt to ensure that an otherwise good engine is not condemned on account of a mishap to some minor part—which may be due to faulty material—but that, on the other hand, an engine in which important parts or units keep giving trouble, and which, therefore, suffers from defective design or workmanship, is heavily penalised.

It would not be easy to improve upon the regulations, and we congratulate those responsible for the fair-mindedness and evident endeavour to draft really useful rules upon the manner in which they have carried out their difficult task.

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**The Safety Fuel Tank Competition**

The Air Ministry Competition for safety fuel tanks, which was held at Farnborough, is now ended, and the official report on the competition and on the result has been issued. Extracts from it are published elsewhere in this issue, from which it will be seen that the winner of the First Prize of £1,400 is the India-Rubber Gutta-Percha and Telegraph Works Co., Ltd., of Silvertown. Second Prize (£400) has been awarded to Imber Anti-Fire Tanks, Ltd., and Third Prize (£200) to Commander Boothby, R.N. It will be noticed that in the preliminary tests, the order of merit of the three tanks was exactly the reverse of the order in the final award.

But little has been disclosed in the Air Ministry report relating to the actual design of the different tanks, except such data as capacity, weight and shape. We should have liked to see detail drawings of the tanks, so as to form an opinion of the design. In the absence of these it is scarcely possible to form an opinion of the progress represented, and one is but little the wiser, except for the Air Ministry statement that the competition "has produced a type of safety fuel tank which is available for immediate introduction on Service and civil aircraft, and which, for a slight increase in weight, gives almost complete immunity from fire, either in a crash or in action with enemy machines."

So far this appears to be satisfactory, and it is to be hoped that some of these tanks, or later developments of them, may soon be found on all commercial aircraft. The danger from fire is a very real one, and anything which tends to eliminate, or at any rate reduce, this risk is to be welcomed. At the same time, if the fitting of these tanks is to be made compulsory, it should be kept in mind that the conditions of the tests were so severe (we are now referring particularly to the crashing tests) that to ensure the tanks standing up against them they had to be made heavier than is probably necessary for commercial work. This should be borne in mind if there is any intention of making their fitting compulsory, and a slight reduction in weight should be allowed. This should not seriously interfere with the resistance to fire due to crashing. With regard to Service aircraft, questions of danger from fire, due to enemy action, may render it advisable to retain the tanks at the competition strength and weight.

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**Heavy Loading or Light Loading**

In this issue of FLIGHT we publish a description of the Vickers "Vulcan" commercial biplane, with Rolls-Royce "Eagle" engine. This machine is of more than usual interest, inasmuch as it represents the first modern attempt to produce a lightly loaded machine for commercial use. At present there may be said to be two schools of thought on the subject of commercial machines. One maintains that the heavily-loaded machine which lands very fast is just as safe in case of accident, while its high loading gives it an advantage at top speed, and certain structural advantages arising out of its smaller size. The other considers low landing speed necessary for safety and economy, maintaining that the high landing speeds reached during the war were only brought about and tolerated on account of the demand for high performance at almost any cost. Hitherto the "high-loading'ites" have been most prominent as regards actual machines in use, and it remained for Mr. Pierson of Vickers to produce a lightly-loaded machine in which modern features were incorporated. The performance of the "Vulcan" on actual service will therefore be watched with very considerable interest, and if, as seems probable, this machine is able to give a good account of itself, it may mean a return to landing speeds more of the order of those obtaining before the war, with, probably, corresponding increase in the useful load.

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**Russo-German Air Mail.**

FROM Berlin it is reported that next month will see the inauguration of the air mail over portions of the route between Berlin and Moscow. Mails will be sent from Berlin to Königsberg by the night train, and the mail aeroplane will leave Königsberg in the early morning. The first stage of the flight is to be to Vitbesk, a distance of approximately 400 miles. Here the mails will be transferred to another machine, which will cover the remaining 350 miles to Moscow. In the opposite direction the mail 'plane will leave Moscow in the early morning, arriving at Königsberg in time for the mails to catch the night train for Berlin. On the Russian side, it is stated, the service will be run by the Soviet Government, while on the German side it will be operated by the Aero Union Company. This company has a capital of 5 million marks, and such well known firms as the Hamburg Amerika Line, the Zeppelin Co., and the Allgemeine Electricitätsgesellschaft are stated to be interested in it.

FLIGHT
AIRCRAFT ENGINEERS AEROPLANE

# THE VICKERS "VULCAN" EIGHT-PASSENGER COMMERCIAL BIPLANE

## 360 H.P. Rolls-Royce "Eagle VIII" Engine

AT the Weybridge works of Messrs. Vickers, Ltd., a new commercial aeroplane is nearing completion; in fact, by the time these notes appear, the first machine of the "Vulcan" class will probably have been put through its preliminary tests by Capt. Cockerell. As distinct from recent Vickers land machines of Mr. R. K. Pierson's design, the "Vulcan" is a single-engined biplane, although retaining in other respects many of the features which distinguish Vickers machines.

At the time of our visit to the works, the first of the "Vulcans" was not completed, and it has not, therefore, been possible to include in this description photographs of the machine. The scale drawings on p. 254, will, however, give a very good idea of the general lay-out. The first feature which one notices is the unusual depth of the *fuselage*, which extends right up to and serves as a support for the top plane. One result of this great depth is that in side view the *fuselage* looks somewhat stumpy, although the streamlining is uncommonly good. The width of the *fuselage* is not, of course, nearly so great, as will be seen from the plan view, and the resistance of the *fuselage* is probably very low.

### General Design

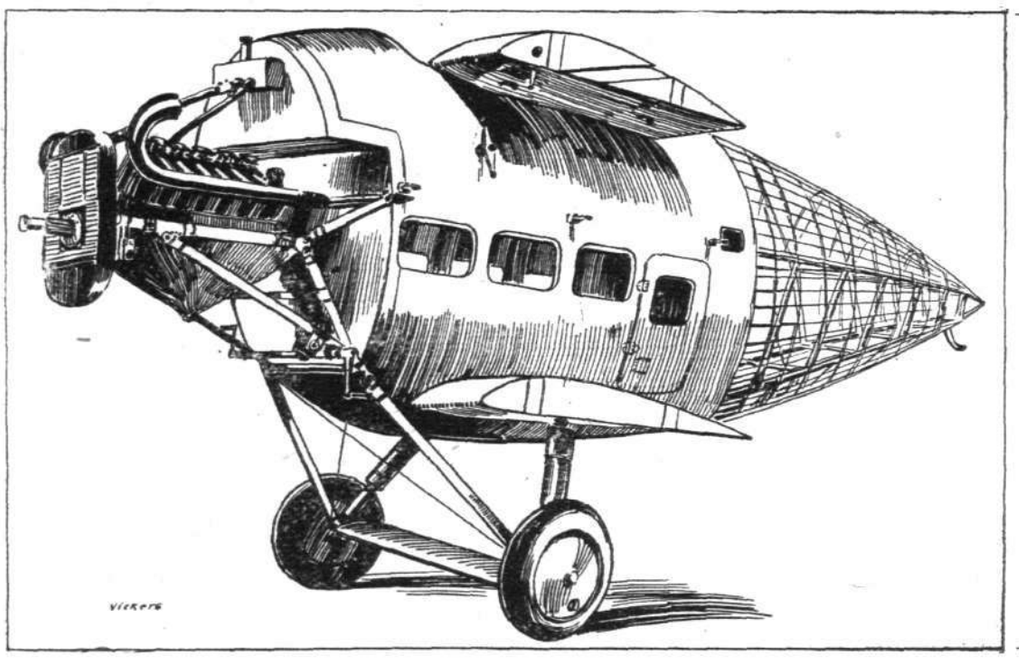
Although of considerable span—49 ft.—there is only one pair of interplane struts on each side. This reduction in the wing bracing has been made possible by the adoption of a thick section, high-lift wing. The actual section employed is one of the airscrew sections, No. 62, we believe, with flat bottom camber. The space available for spars is, therefore, considerable, and the long bays are further relieved by building up the wings as continuous beams. In the drawing, it will be noticed that the wing roots, both top and bottom, extend some distance out from the *fuselage*. The reason for this arrangement is that the joint between spar root and inner end of end section spar occurs at the point of contraflexure, where the bending moment is zero, and where, consequently, the fish-plates of the joint have to resist shear only.

As regards general design, the "Vulcan" is a relatively low-powered weight-carrying commercial machine, in which economy in manufacture and operation have been given precedence over performance. Every endeavour has been made to make the "Vulcan" a truly commercial machine, and if it is not quite so fast as some modern commercial machines, it possesses other features which, in our opinion, more than outweigh the relatively low cruising speed of 90 m.p.h. To begin with, the machine carries eight passengers on one Rolls-Royce engine of 360 h.p., so that the power expenditure is only 45 h.p. per passenger at full power, and a maximum speed of about 105 m.p.h. This should certainly bring the machine within sight of being able to show a profit without the aid of a Government subsidy. Furthermore, the low landing speed (about 40 m.p.h. on estimated figures) should make for safety, and should also enable the machine to get out of quite small fields. It is also possible that for a machine which lands so slowly, a lower insurance premium might be required, all of which are points in favour of the lightly-loaded and relatively slow commercial aeroplane.

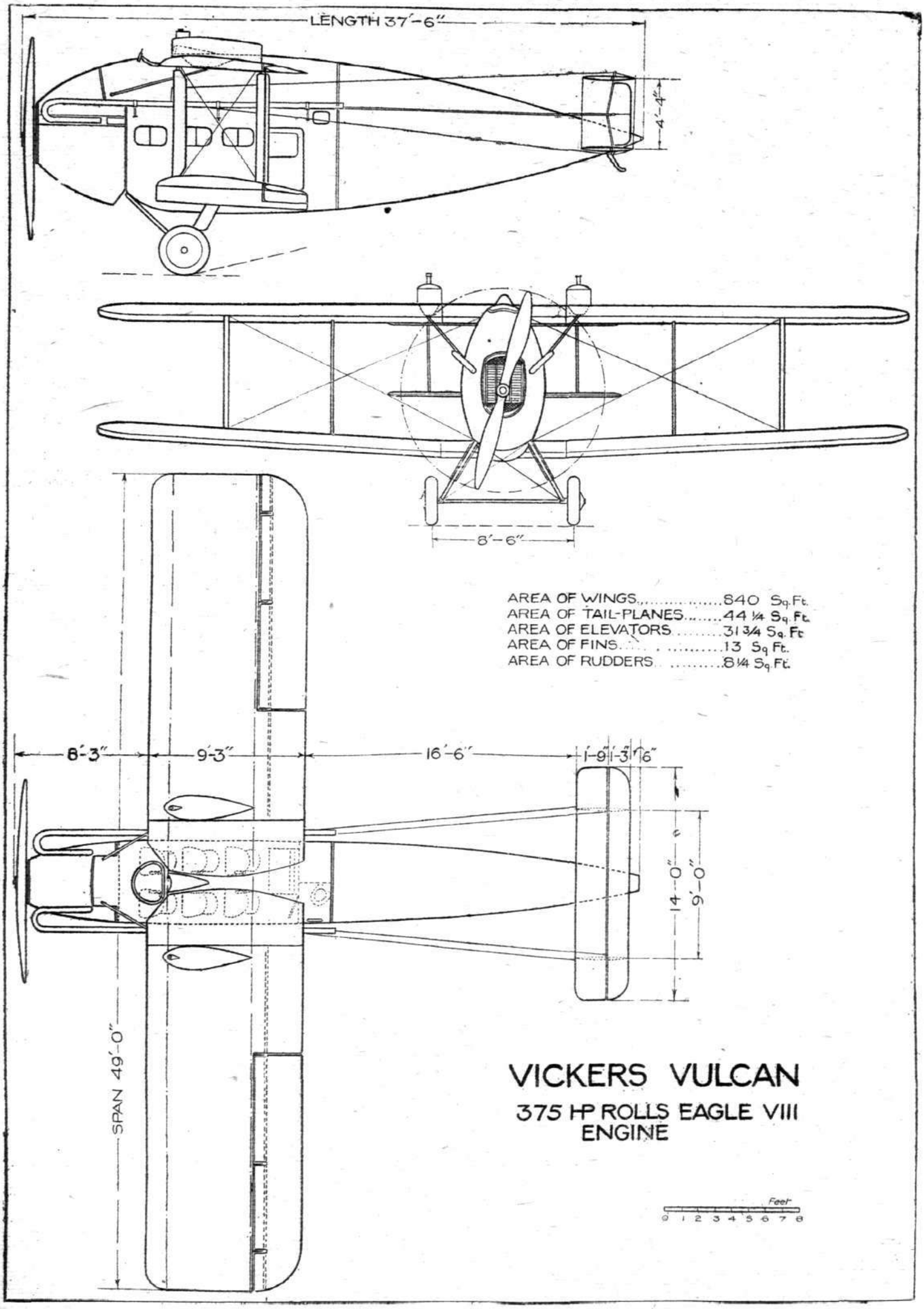
### The Fuselage

In the main, the *fuselage* construction is similar to that familiar from such Vickers machines as the Vimy-Commercial Vernon, Victoria, and Virginia. That is to say, the front portion, which forms the cabin, is of *monocoque* construction and elliptical cross-section, while the rear portion of the *fuselage* is a girder of *longerons* and struts, braced with tie rods. The wooden members of this girder are of the typical Vickers type, *i.e.* they are hollow tubes of wood. The manner of building up these tubes is very ingenious, and has been proved in practice to give great strength and resistance to hard wear. Each strut or *longeron* is built up of three pieces, spindled out from rectangular section strips to form a third of a circle. The three pieces are then glued together, with tongues of hardwood, and the whole further strengthened by being bound with tape. At the ends, and, in the case of the *longerons*, where the strut fittings are attached, the three strips composing the tube are left solid, and the triangular space left is filled with a wood plug, making the *longeron* solid. The process of manufacture is, we understand, quite cheap, and, of course, for members which are loaded as struts the tubular section is the most efficient. The *longerons* work out very light, especially as they are of fairly large diameter, and the section thus has a large moment of inertia.

The sheet steel fittings are wrapped around the *longerons*, and in the "Vulcan" an improvement has been incorporated which allows of taking up any slack arising from shrinkage of the *longerons*. This is in the form of an aluminium packing piece on which the bolts are tightened up. If the *longeron* shrinks, as it might do to a certain extent in tropical climates, the bolts are removed and the packing piece replaced by a thinner one. The bolts are then put back and tightened up. The extreme rear portion of the *fuselage* of the "Vulcan" is a steel tube structure carrying the tail skid, and it terminates in a short transverse tube into which a tube or rod can be




**The Vickers "Vulcan": Three-quarter front view of *fuselage* before engine cowl and fabric covering of rear portion are put on.**




THE VICKERS "VULCAN": General arrangement drawings.

inserted for enabling two or more men to lift the tail when the machine is being moved about on the ground. A fairing in the form of light formers and stringers is built on outside the main *fuselage* structure, to bring it up to an elliptical section.

The cabin portion of the *fuselage* is, as already mentioned, built up as a *monocoque* shell, with formers of rectangular box section, but forming, of course, ellipses conforming to the shape of the *fuselage*. Into these formers are let the longitudinal stringers, or *longerons*, and the whole is covered with three-ply wood, screwed on in relatively small panels. When finished, the entire cabin portion is covered with fabric and doped.

### The Wing Structure

It has already been stated that the wings of the "Vulcan" are of thick section, and that therefore the spars are of considerable depth. The spars are of the box type, with top and bottom flanges of spruce, and sides of three-ply wood. As in the case of the *fuselage longerons* and struts, the wing spars are taped and doped, the fabric further strengthening and protecting the wood underneath.

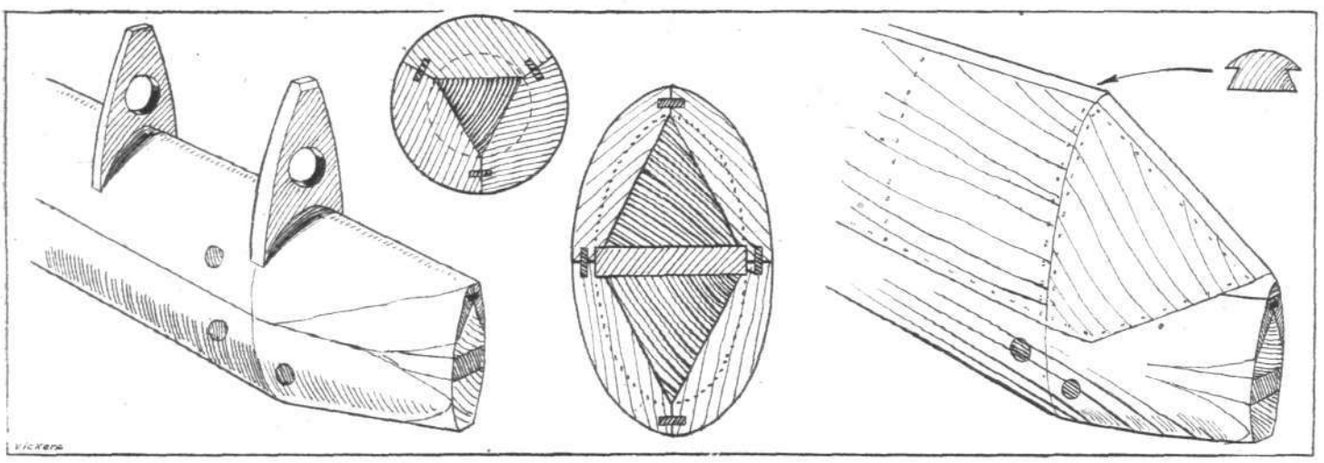
The compression struts between the spars are circular tubes of wood, and constructed similarly to the *longerons* already described. The ribs are of somewhat unusual construction, as shown in one of our sketches, and consist of lattices of spruce, the lattice bars, some of which are single and some double, according to local loads, being attached to the spruce flanges by Vickers Duralumin rivets. This form of rib has been found to be very strong for its weight, and is now employed in all Vickers machines.

chord from the leading edge. This tube is carried in bearings mounted on channel section steel brackets bolted to the rear spar. According to whether the *aileron* is up or down, its leading edge moves below or above the rear spar, and the portion in front of the pivot serves as a balance. This type of *aileron* has the advantage that the twisting stress imposed by a horn balance is avoided, but, on the other hand, the load on the steel brackets, and the resulting twisting stress on the rear spar, is probably considerable. However, owing to the thickness of the wing, it is a fairly easy matter to take care of these loads. Aerodynamically, this form of *aileron* is, we believe, very efficient. At any rate, it appears to be so on the Handley Page W.8 and W.8B. There is no direct control to the *ailerons* of the lower plane, these being operated by *aileron* struts running from lugs on the top *aileron* to similar lugs on the lower ones. It should be observed that these struts are attached to the leading edges, and not, as is more usual, to the trailing portion of the *ailerons*. This is another instance of the amount of thought and attention given to details by Mr. Pierson. By the arrangement adopted, the *aileron* struts are made to work in tension when the greatest loads occur, and only work in compression under relatively small loads. It might be mentioned that the *ailerons* are standardised so that the same spares will do for both top and bottom planes.

The tail is of the biplane type, similar to that of the "Viking," and does not call for any special description.

### The Engine Mounting

One of the accompanying sketches shows the mounting of the Rolls-Royce "Eagle." The whole engine mounting



**THE VICKERS "VULCAN": Some details of the construction of circular and streamline section struts and longerons.**

As already mentioned, there is only one pair of interplane struts on each side. The construction of these struts is illustrated in one of the accompanying drawings. The strut proper is built up of four strips, spindled out to form an elliptical section. To this is added a fairing composed of thin three-ply, supported on triangular formers attached to the back of the strut. Both as regards cost of manufacture and strength for weight, these struts have proved very good, and it might be mentioned that a series of loading tests carried out on specimen struts have given the very high loading figure of 1,000 lbs. per lb. weight of the strut. In other words, a strut weighing 28 lbs. supported an end load of 28,000 lbs. This, of course, is extremely good, and indicates the constructional advantages of this form of strut construction. Add to this that the struts are cheap to build, waste but little wood, and are composed of strips so thin that defects can be easily spotted, and it will be seen that the hollow wood strut is difficult to improve upon.

The wing bracing is of straightforward type, with streamline wires attached to wiring lugs of usual type. Owing to the fact that there is only one pair of struts on each side, the bracing has been reduced to a minimum, and probably forms a very good compromise between the usual two-bay braced biplane and the cantilever wing, which works out somewhat heavy.

Constructionally, the *ailerons* are similar to the wings, but the manner of balancing them is somewhat unusual. Instead of being hinged on the rear spar, the *ailerons* have a tube running through them at a distance of about .28 of their

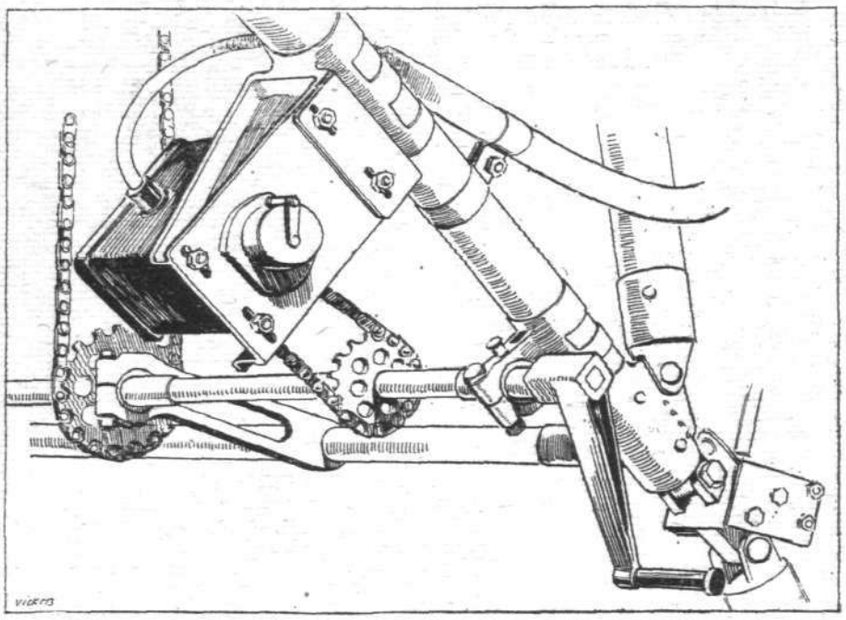
structure is composed of tinned steel tubes so arranged as to give perfect, or nearly so, triangulation. The whole engine unit can be detached from the *fuselage* by undoing four bolts and the engine controls and petrol leads. The former are very simple and of short length, owing to the position of the pilot immediately aft of and slightly above the engine. They are all of the pull-and-push rod type, with crank arms where their direction has to be changed. As for the petrol leads, these also are of very simple form, consisting of two pipes, one from each tank, running to a T-piece from which a single pipe runs to the carburettor *via* a B.S.A. filter. This filter, it might be mentioned, is so arranged that the gauze can be removed and cleaned without interfering with the pipes themselves.

The starting gear consists of a transverse shaft running across the sloping tubes of the engine mounting, and driving the engine shaft *via* chains. The shaft has a handle at each end, so that, if necessary, two men can turn simultaneously. The starting magneto is mounted on the port side, and is driven by a chain from the same transverse shaft. This does away with the old-fashioned way of having the pilot turn the starting magneto while the engineer turns the engine. In order to take up any slack that might develop in the two chains, the transverse shaft is mounted in eccentric bushes held in split collars, so that a slight turn of the proper bushes, according to whether it is the engine chain or that to the starting magneto, tightens up the chains.

A nose radiator is fitted, mounted on the tubular engine bearers by lugs provided with rubber washers to reduce

vibration. The water tank is carried on the front wall of the portion of the pilot's cock-pit which projects forward over the aft portion of the engine.

As shown in our sketches the cowl is not in place. This cowl is a very large one, of beaten aluminium, and gives a very smooth entry for the air. At the bottom the cowl has



**THE VICKERS "VULCAN": Details of the starting gear, showing starting magneto, adjustable eccentric bushes, etc.**

a large inspection door through which the engineers can get at the bottom of the crank case, oil pump, etc. On top, there are two doors, hinged along the centre line, and lifted up as an ordinary car bonnet. Bonnet fasteners similar to those used on cars are employed, so that it is a matter of a few moments only to get at the engine.

### Petrol System

One of the features of the Vickers "Vulcan" which should be of particular value is the employment of direct gravity feed. Two petrol tanks are mounted on the top plane, some distance out so as to be clear of the propeller slip stream, and the fuel runs through pipes to a T-piece in the pilot's cockpit, whence a single pipe is taken to the carburettor. The tanks rest on the top of the plane, and have large sumps so arranged that no matter whether the machine is flying level, descending or climbing the petrol can be drained out, to the last drop practically. There are two unions on the tank sumps, one for the feed pipe, and the other for a drain cock. Capacity indicators are incorporated in the tanks themselves, and are so placed that they can be read from the pilot's cockpit. Thus the whole system is about as simple as it is possible to get it, and it will be interesting to see what effect the gravity system will have on the number of forced landings. Many of these have, in the past, been due to trouble somewhere in the petrol system, and with the gravity feed all these should be avoided.

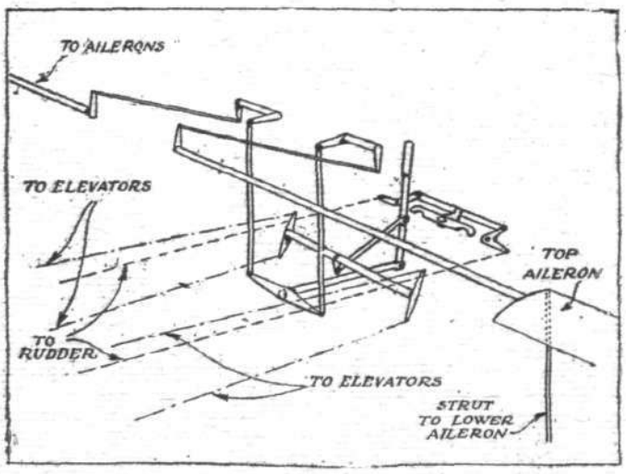
### The Undercarriage

After months of experimental work on oleo-pneumatic undercarriages, Messrs. Vickers have evolved a type which actually weighs slightly less (about two pounds per "leg") than the usual type with rubber shock-absorbers. Without going into details, it may be said that the arrangement consists of pumping air into a cylinder and locking it there by means of an oil seal. The shock-absorbing qualities are very good, and bouncing is entirely eliminated. The undercarriage is of simple V-type, with the front "legs" hinged to the *fuselage* and diagonally braced by cable, while the rear legs are telescopic and incorporate the oleo gear. The tail skid is of ash, and is provided with a shoe of manganese steel. This shoe is so hard that it is a matter of some difficulty to drill the holes in it. It should therefore, stand up well to the wear and tear of taxying. It is, however, easily renewable by undoing four bolts.

### Controls

The pilot's cockpit, situated in the roof of the *fuselage*, and occupying the front upper corner of the cabin, partly projects over the rear portion of the engine. The view obtained from it is exceptionally good, although, owing to the fact that the pilot's head is practically in line with the propeller tips, this position will probably be somewhat draughty. The engine is placed relatively low, and there is no difficulty in looking over the top of it, even straight ahead. The only feature which might give rise to trouble is the very high position, the pilot's head being approximately 13 ft. above the ground when the machine is horizontal and the wheels on the ground. However, a little experience should familiarise the pilots with this high position, and after that there should be no difficulty. Certainly the view is about as good as it is possible to make it in a single-engined machine. In order to afford some measure of protection to the pilot's head, in case the machine should turn over, there is a tubular stiffener in the fairing behind his head. This stiffener is very strong, and should prevent the fairing from caving in. It will be padded with leather, but, as shown in one of our sketches, this padding has not been put on. It will be noticed that inside the fairing there is a slide with slots in it. This is the entry for the fresh air to the cabin, and it is thought that sufficient will find its way past the pilot's head, where it rests against the stirrup-shaped padded stiffener. On its way to the cabin the air passes through a diffuser box so as to avoid draught.

The instrument board is fitted out with all the usual instruments, which are all well in sight and illuminated. The controls are of fairly orthodox arrangement, although certain unusual features are found in one or two places. The "joystick" is mounted on a fork on the front end of a longitudinal rocking shaft carried in bearings under the floor of the cockpit. At its rear end this shaft carries two cranks from which tubes run vertically up to cranks mounted on the inner ends of, and pointing aft from, two transverse tubular shafts resting in the wing roots. These transverse shafts carry on their outer ends cranks pointing downwards, from which tubes run aft and upwards to the cranks on the *aileron* tubes. There are thus no cables, wires or rods anywhere in the *aileron* control system. From the joystick, a tube runs back to a crank on the transverse tubular shaft that carries on its outer ends the elevator cranks. From these latter cables run to the elevators. The rudder bar has a forward projection in its centre engaging with a transverse tube which at each end engages with an elbow crank from whose outer arm cables run to the rudders. The arrangement




**THE VICKERS "VULCAN": Perspective diagram of the control system.**

of the controls will be better understood from a reference to the diagrammatic sketch. The tail is adjustable, but not during flight, and there is an elevator trimming gear similar to that of the "Viking," described and illustrated in FLIGHT of October 6, 1921.

### The Cabin

It has already been mentioned that the cabin has seating accommodation for eight passengers. The seats are of a special type designed by Vickers, and when not in use fold

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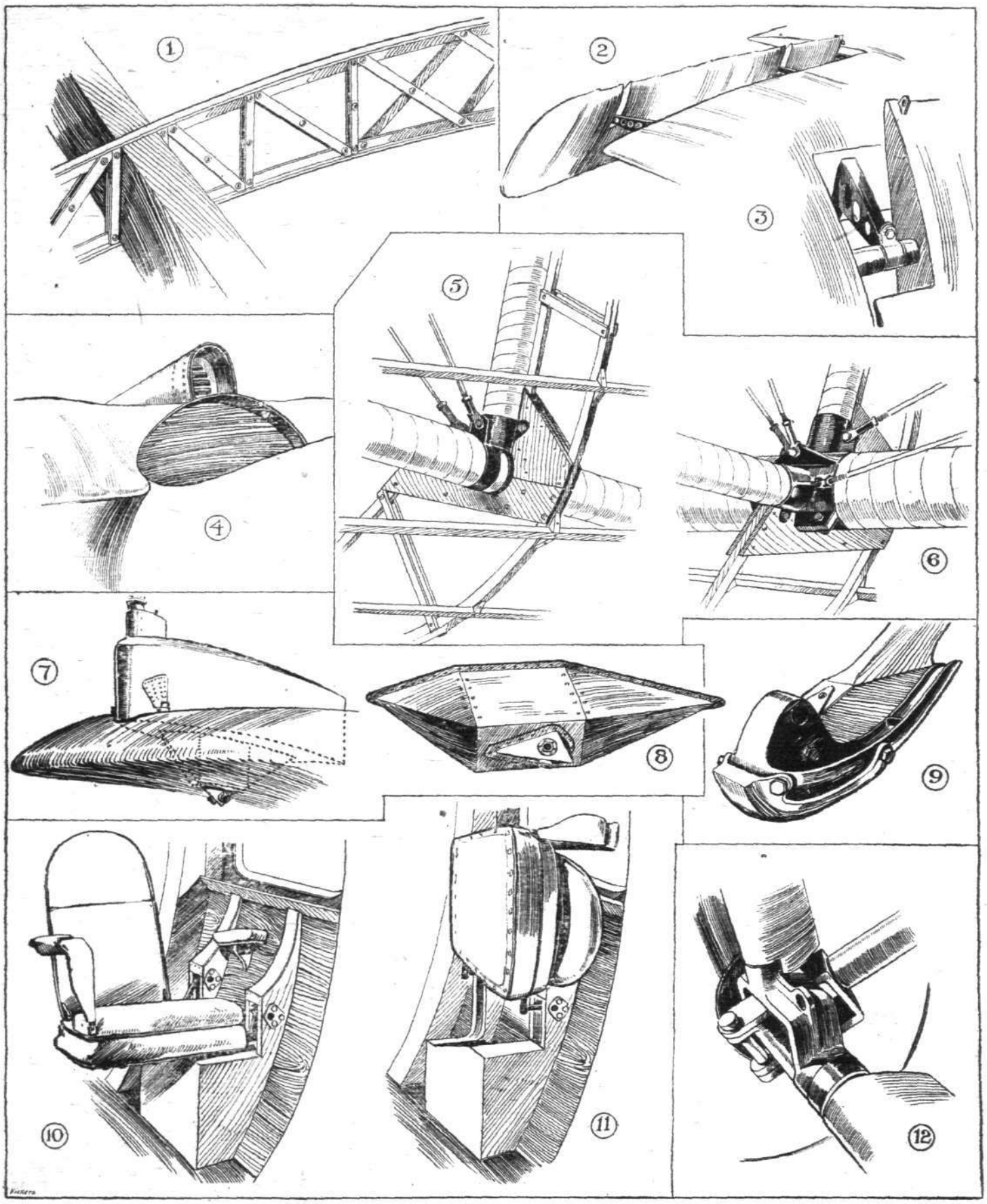


THE VICKERS "VULCAN": Some constructional details. 1. Lattice rib construction. 2. Balanced aileron. 3. Details of aileron mounting. 4. The fairing behind the pilot's head has a tubular stiffening piece to act as a protection in case the machine turns over. Inside the fairing may be seen the ventilator for the cabin. 5. shows details of the manner of building a light structure on to the main fuselage girder in order to turn it into an elliptical section. 6. One of the fuselage longeron clips. (Note the aluminium packing piece which allows of tightening up the fitting in case of shrinkage of the longeron.) 7. One of the petrol tanks mounted on the top plane. 8 is an underneath view of the sump of the petrol tank. 9 shows the detachable steel shoe on the tail skid. 10 and 11 are views of one of the seats, open and folded. 12. Shows the details of the undercarriage where the struts meet the axle. Note how the bending moment has been kept as small as possible by fitting the struts close to the inner end of the wheel hub.

up against the sides of the cabin. The back rest folds forward on to the seat, and the whole then turns on longitudinal hinges, folding upwards and outwards, as shown in two of our sketches. Should it be desired to use the machine for carrying goods, the seats may be easily removed, each being held in place by two bolts only.

A feature of the cabin is the great amount of head-room, about 8 ft. This results from the *monocoque* construction and the elliptical cross section of the *fuselage*. In front this head-room is somewhat smaller, owing to the projection of the pilot's cockpit into the front part of the cabin. At the rear a smaller portion is cut off by a locker or luggage space in the roof, but there is still plenty of room for even a tall man to stand upright.

In the front wall of the cabin there is a small door on each side, through which the pilot may communicate information to the passengers. Between the two doors is a narrow panel enclosing the two vertical tubes of the *aileron* control. The top of this panel is left open so that the attachment of the tubes to the cranks is always exposed and easily accessible for adjustment. Incidentally, a passenger who knows something about flying may, by watching theses tubes, get an idea of the amount of use being made of the *ailerons*.

Behind the cabin, and separated from it by a transverse bulkhead, is a compartment divided into two. That on the port side is a diminutive lavatory, while on the starboard side is the luggage compartment. The latter is divided into two "stories," the upper of which is reached from the cabin through a door in the rear wall, and evidently meant for "wanted during the journey" luggage. The lower luggage compartment, which has a portion projecting forward under the double seat on the starboard side, is reached through a door in the starboard side of the *fuselage*.

By the time this issue of FLIGHT is distributed, the first of the "Vulcans" should have been in the air on its preliminary tests. It will then, probably, go to Martlesham for type tests, and should be on the London-Paris service (Instone Air Line) in a couple of weeks. The main characteristics of the "Vulcan" are as follows: Engine, Rolls-Royce "Eagle VIII"; length of machine o.a., 37 ft. 6 ins.; height o.a., 14 ft. 3 ins.; span, 49 ft.; chord, 9 ft. 3 ins.; maximum gap, 8 ft.; area of main planes, 840 sq. ft; wing loading, 7.3 lbs./sq. ft.; power loading, 17 lbs./h.p. weight of machine empty, 3,775 lbs. (pilot, 180 lbs.); 72 gallons of petrol, 510 lbs.; 5 gallons of oil, 45 lbs.; reserve water (2 gallons), 20 lbs.; W/T, 100 lbs.; eight passengers at 160 lbs., 1,280 lbs.; luggage or freight, 240 lbs.; total loaded weight, 6,150 lbs. Maximum speed near ground (estimated) 105 m.p.h. Cruising speed (estimated) 90 m.p.h. Landing speed (estimated) 40 m.p.h. Climb to 6,000 ft. (estimated) 14 mins.

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# ROYAL AIR FORCE CADETSHIPS. FORTHCOMING ENTRANCE EXAMINATION

THE Air Ministry announces that an examination for entrance into the Royal Air Force Cadet College, Cranwell, will be held on June 27, 1922, and following days. The number of Cadetships open to competition at this examination will not be less than 20 inclusive of King's Cadets or Honorary King's Cadets, and will include the award of not less than one prize Cadetship.

In addition, one Wakefield Scholarship of the value of £75 per annum is offered for competition among candidates whose parents or guardians are in reduced circumstances, with preference to cases due to the late war.

Candidates must have attained the age of 17½, and not exceeded the age of 19 on July 1, 1922, the only exception being in the case of candidates with previous service prior to January 1, 1920, or service in the Senior Division of the O.T.C. prior to March 1, 1919, in which case the upper limit of age will be 21.

Candidates must apply in writing to the Secretary, Civil Service Commissioners, Burlington Gardens, London, W. 1, for forms of application, and the forms should be completed and returned not later than May 11 next. No application received later than May 25 will be accepted under any circumstances.

The competition will be conducted in accordance with the Regulations for the Royal Air Force (Cadet) College; (Air Publication 121), which may be obtained from His Majesty's Stationery Office, Imperial House, Kingsway, W.C. 2. Price 9*d*.

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## ROYAL AERONAUTICAL SOCIETY NOTICES

*Lectures.*—The following programme of lectures has been arranged for next Session :—

October 5.—Prof. L. Bairstow, Fellow, "The Work of S. P. Langley."

October 19.—Mr. J. D. North, Fellow, "The Metal Construction of Aeroplanes."

November 2.—Major A. R. Low, Fellow, "A Review of Airscrew and Helicopter Theory, with Aeroplane Analogies."

November 16.—Mr. R. McKinnon Wood, Fellow, "The Co-relation of Model and Full Scale Work."

December 7.—Prof. C. F. Jenkin, "Fatigue in Metals."

January 4.—(To be announced later).

January 11.—Juvenile Lecture, Mr. R. A. Frazer, "Testing of Model Aeroplanes."

January 18.—(To be announced later).

February 1.—Mr. G. S. Baker, "Ten Years' Testing of Model Seaplanes."

February 15.—Wing-Commander Cave-Browne-Cave, "The Practical Aspects of the Seaplane."

March 1.—Major F. M. Green, "Helicopters."

March 15.—Prof. B. Melvill Jones, "The Control of Aeroplanes at Low Speeds."

*Representatives on other bodies.*—The following representatives on other bodies have been nominated for the year ending April, 1923 :—

*Conjoint Board of Scientific Societies.*—Lieut.-Col. M. O'Gorman.

*Aeronautical Research Committee.*—Lieut.-Col. A. Ogilvie.

*Advisory Committee on Aeronautical Education.*—Prof. C. F. Jenkin.

*British Engineering Standards Association Aircraft Committee.*—Lieut.-Col. M. O'Gorman.

*B.E.S.A. Aircraft Sub-Committee No. 1 (Nomenclature).*—Prof. L. Bairstow, Lieut.-Col. M. O'Gorman, Dr. Sutton Pippard, Mr. J. D. North, Major R. V. Southwell, Lieut.-Col. W. Lockwood Marsh.

*Civil Aviation Advisory Board.*—Lieut.-Col. M. O'Gorman.

*International Air Congress, 1923; Organising Committee.*—Mr. Griffith Brewer, Lieut.-Col. M. O'Gorman, Lieut.-Col. A. Ogilvie, Lieut.-Col. W. Lockwood Marsh (Technical Sec.).

W. LOCKWOOD MARSH,
Secretary

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## THE LONDON AERO-MODELS ASSOCIATION

AT the Meeting held on April 27 it was decided that all members must put protectors on their machines. On Thursday, May 4, an important meeting will be held at Headquarters, and members are particularly requested to attend.

Sunday, May 7, R.O.G. Competition on Wimbledon Common (see last week's FLIGHT for full particulars).

On Saturday, May 20, a Smoking Concert will be held at Headquarters at 7.30 p.m., Mr. J. E. Louch most kindly making all arrangements and providing an excellent array of artistes. It is earnestly hoped that members will show their appreciation by attending.

On Sunday last there was a special muster of members on Wanstead Flats to give a flying demonstration. Unfortunately, the wind was of a downward trend, and it was impossible to get models up very high. Mr. Bedford was flying an enclosed model somewhat resembling a Blériot type, getting excellent results from same. Mr. C. Hersom had an enclosed model, the body resembling that of a flying fish. Mr. C. A. Rippon was very prominent with a large spar model. Mr. S. Holton was making excellent progress with a new model. About ten other members were flying models, Mr. Bedford concluding a most enjoyable meeting by demonstrating the flying of his twin pusher hydroplane. Three new members were recruited.

Meetings are held at Headquarters, 20, Great Windmill Street, Piccadilly Circus, W. 1, every Thursday at 7.30 p.m. All interested in model aeronautics are cordially invited.

Hon. Sec., A. E. Jones, 48 Narcissus Road, West Hampstead, N.W. 6.

# The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

## COMMITTEE MEETING

A Meeting of the Committee was held on Wednesday, April 26, 1922, when there were present:—Lieut.-Col. J. T. C. Moore-Brabazon, M.C., M.P., in the Chair, Wing-Commander W. D. Beatty, C.B.E., R.A.F., Maj.-Gen. Sir Sefton Brancker, K.C.B., Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., Lieut.-Col. F. K. McClean, Lieut.-Col. Alec Ogilvie, Lieut.-Col. Mervyn O'Gorman, C.B., and the Secretary.

**Election of Chairman.**—On the motion of Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., seconded by Lieut.-Col. Alec Ogilvie, Lieut.-Col. J. T. C. Moore-Brabazon, M.C., M.P., was unanimously elected Chairman of the Club for the current year.

On the motion of Lieut.-Col. J. T. C. Moore-Brabazon, M.C., M.P., seconded by Maj. Gen. Sir Sefton Brancker, K.C.B., a unanimous vote of thanks was passed to Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., the retiring Chairman.

**Election of Vice-Chairman.**—On the motion of Lieut.-Col. Mervyn O'Gorman, C.B., seconded by Maj.-Gen. Sir Sefton Brancker, K.C.B., Lieut.-Col. F. K. McClean was unanimously elected Vice-Chairman of the Club for the current year.

**Election of Members.**—The following new Members were elected:—

James Rawstron Bracewell.
Harold Chester-Master.
Henry Ronald Godfrey.
Eric Dorrien Kirby.
Charles Edward Lee, J.P.
Sub-Lieut. Alfred James Angus Miller, R.N.
Flight-Cadet Gilbert Edward Nicholetts.
Major John Thorpe Reckitt, R.A.S.C.
Capt. Reginald Herbert Stocken.

**Steward of the Club.**—The following were elected Stewards of the Club for the current year:—

Brig.-Gen. The Duke of Atholl, K.T., M.V.O., D.S.O.
The Right Hon. Lord Hugh Cecil, M.P.
The Earl of Halsbury.
Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S.
The Lord Kinnaird, K.T., J.P., D.L.
Admiral of the Fleet The Right Hon. Sir Edward Seymour, G.C.B., O.M.

**Sub-Committees.**—The following Sub-Committees were appointed:—

*Sub-Committees, 1922.*—Lieut.-Col. J. T. C. Moore-Brabazon, M.C., M.P. (Chairman), Lieut.-Col. F. K. McClean (Vice-Chairman), Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S. (Members of all Sub-Committees).

*Racing Committee.*—Maj.-Gen. Sir Sefton Brancker, K.C.B., Lieut.-Col. W. A. Bristow, Lieut.-Col. M. O. Darby, Col. F. Lindsay Lloyd, C.M.G., C.B.E., W. O. Manning, N. C. Neill, Howard T. Wright.

*Technical Committee.*—Capt. W. G. Aston, Griffith Brewer, Eng.-Commander W. Briggs, R.N., Major R. H. Mayo, Lieut.-Col. A. Ogilvie, C.B.E., Lieut.-Col. Mervyn O'Gorman, C.B., Howard T. Wright.

*Joint Standing Committee.*—Lieut.-Col. Alec Ogilvie, C.B.E., Rear-Admiral Sir Godfrey M. Paine, K.C.B., M.V.O.

*Flying Services Fund Committee.*—H.R.H. The Duke of York, K.G., Group-Capt. F. W. Bowhill, C.M.G., D.S.O., Flight-Lieut. L. H. Cockey, Lieut.-Col. Alan Dore, D.S.O., Chester Fox, Wing-Commander T. O. B. Hubbard, M.C., Air-Commodore C. R. Samson, C.M.G., D.S.O.

*Finance Committee.*—Wing-Commander W. D. Beatty, C.B.E., Ernest C. Bucknall, J. H. Nicholson, Lieut.-Col. Alec Ogilvie, C.B.E.

*House Committee.*—Major H. Graeme Anderson, Ernest C. Bucknall, Flight-Lieut. L. H. Cockey, Major Herbert J. Corin, D. C. MacLachlan, J. Stewart Mallam, Capt. D. G. Murray, Capt. L. V. Pearkes.

*Timekeepers.*—The following timekeepers were appointed:—F. T. Bidlake, A. V. Ebblewhite, Major A. H. Loughborough, A. G. Reynolds, Sir Zachariah Wheatley.

## BANQUET TO CELEBRATE THE TWENTY-FIRST ANNIVERSARY OF THE FORMATION OF THE CLUB

It was decided to hold a Banquet, probably in June, to celebrate the twenty-first anniversary of the formation of the Club.

The arrangements were left to a Sub-Committee, consisting of Maj.-Gen. Sir W. S. Brancker, K.C.B., Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., Lieut.-Col. F. K. McClean, and Mr. E. C. Bucknall.

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary.

# THE LONDON-CONTINENTAL SERVICES

**FLIGHTS BETWEEN APRIL 23 AND APRIL 29, INCLUSIVE**

| Route‡ | No. of flights* | No. of passengers | No. of flights carrying Mails | No. of flights carrying Goods | No. of journeys completed† | Average flying time | Fastest time made by | Type and (in brackets) Number of each type flying |
|---|---|---|---|---|---|---|---|---|
| | | | | | | h. m. | | |
| Croydon–Paris ... ... | 46 | 64 | 12 | 30 | 46 | 2 32 | Breguet F-CMAL (1h, 50m.) | B. (4), Br. (1), D.H. 4 (2), D.H. 18 (2), D.H. 34 (1), G. (5), H.P. (1), Sp. (5). |
| Paris–Croydon ... ... | 47 | 130 | 7 | 30 | 45 | 2 57 | D.H.34 G-EBBS (2h. 15m.)... | B. (3), Br. (1), D.H. 4 (2), D.H 18 (3), D.H. 34 (1), G. (7), H.P (1), Sp. (5). |
| Croydon–Rotterdam–Amsterdam.§ | 6 | 1 | 6 | 6 | 6 | 2 31 | — | F.(4). |
| Amsterdam–Rotterdam–Croydon.‖ | 7 | 8 | 6 | 6 | 6 | 3 34 | — | F. (4). |
| Totals for week ... | 106 | 203 | 31 | 72 | 103 | | | |

§ 5 to Rotterdam only. ‖ 5 from Rotterdam only.

* Not including "private" flights. † Including certain journeys when stops were made *en route*.
‡ Including certain diverted journeys.

Av. = Avro. B. = Breguet. Br. = Bristol. Bt. = B.A.T. D.H.4 = De Havilland 4, D.H.9 (etc.).
F. = Fokker. Fa. = Farman F.50. G. = Goliath Farman. H.P. = Handley Page. M. = Martinsyde. N. = Nieuport.
P. = Potez R. = Rumpler. Sa. = Saimson. Se. = S.E.5. Sp. = Spad. V. = Vickers Vimy. W. = Westland.

The following is a list of firms running services between London and Paris, Brussels, etc., etc.:—Co. des Grandes Expresses Aériennes; Daimler Hire Ltd.; Handley Page Transport, Ltd.; Instone Air Line; Koninklijkie Luchtvaart Maatschappij; Messageries Aériennes; Syndicat National pour l'Étude des Transports Aériens; Co. Transaérienne.

# SAFETY FUEL TANK: AWARDS

THE Air Ministry announces that the prizes in the Competition for Safety Fuel Tanks for aircraft have been awarded as follows :—

*First Prize*, £1,400.—The India-Rubber, Gutta-Percha and Telegraph Works Co., Ltd., Silvertown, London, E. 16.

*Second Prize*, £400.—Imber Anti-Fire Tanks, Ltd., West Road, Tottenham, London, N. 17.

*Third Prize*, £200.—Comdr. F. L. M. Boothby (R.N. retired), "Overway," Tilford, Surrey.

The Competition was arranged in order to promote the evolution of a reliable type of fuel tank for Service and commercial aircraft, which would reduce the risk of fire, due to crashing or hostile action, to a minimum.

Twenty-six entries were received for the Competition, which was open to the world, and 18 different types of tanks were actually submitted for test.

The judges appointed by the Air Council consider that the Competition has resulted in the achievement of the objects for which it was instituted, and has produced a type of safety fuel tank which, although capable of improvement in several minor respects, is available for immediate introduction on Service and civil aircraft and which, for a slight increase in weight over and above that of the standard Service steel tank, gives almost complete immunity from fire, either in a crash or in action with enemy machines.

All the tanks tested, with a few exceptions, showed marked superiority in almost every respect over the standard Service steel tank now generally in use.

The judges were: Group Capt. E. F. Briggs (Deputy Director of Research), Major B. C. Carter (Directorate of Research), Major J. H. Ledeboer (Directorate of Research), Mr. G. Cockburn (Accidents Investigation Branch), Major J. P. C. Cooper (Accidents Investigation Branch), Mr. H. Grinsted (Royal Aircraft Establishment).

The regulations governing the Competition provided that each entrant had to submit two tanks for preliminary trials and that the three most successful competitors in the first stage should submit four more tanks for final trial.

The principal features of the tanks submitted by the three winning competitors for the preliminary tests are as follows :—

*India-Rubber and Gutta-Percha Co., Ltd.*

| | No. 1. | No. 2. |
|---|---|---|
| Weight of tank .. .. | 78·75 lbs. | 81·25 lbs. |
| Capacity of tank .. .. | 37·7 galls. | 38·2 galls. |
| Weight per gallon capacity .. | 2·08 lbs. | 2·15 lbs. |
| Shape of tank .. .. | cubical. | |

Each consisted of a welded sheet-steel rectangular tank with no frame or baffles of any sort, but with each side slightly dished inwards, inserted in a detachable rubber case.

These tanks were slung in the *fuselage* by means of webbing.

*Imber Anti-Fire Tanks, Ltd.*

| | | |
|---|---|---|
| Weight of tank .. .. | 50 lbs. | 51·5 lbs. |
| Capacity of tank .. .. | 30 galls. | 29·3 galls. |
| Weight per gallon capacity .. | 1·66 lbs. | 1·76 lbs. |
| Shape of tank .. .. | elliptical. | — |

The tank consisted of a light-gauge tinned-steel shell which was separated from the inside by a framework of aluminium tubing and light-gauge aluminium baffle plates. After assembly the whole of the tank had been covered with india-rubber of a suitable thickness, and all joints vulcanised.

*Comdr. Boothby.*

| | | |
|---|---|---|
| Weight of tank .. .. | 33·23 lbs. | 35·75 lbs. |
| Capacity of tank .. .. | 56·8 galls. | 53·7 galls. |
| Weight per gallon capacity .. | 0·58 lbs. | 0·66 lbs. |
| Shape of tank .. .. | cubical. | |

The tank consisted of an inner bag of four-ply rubbered fabric capable of containing the petrol with an outer cover of rubbered fabric which was gas-tight. Non-inflammable gas was introduced into the space between the two shells and maintained under slight pressure. A drain pipe was fitted to the outer casing. The tank was fixed to the *fuselage* by rubber shock absorber and stringing and encased in three-ply glued on.

The three competitors qualifying for the final tests were required to submit four tanks of a type fundamentally similar to those entered for the preliminary trials, any minor modifications which it was desired to incorporate being previously submitted for the consideration and approval of the Judges' Committee. Certain modifications, under these conditions, were made to the tanks submitted by each of the three competitors, the details of these modified tanks being as follows :—

*India-Rubber, Gutta-Percha and Telegraph Works Co., Ltd.*

| | No. 1. | No. 2. | No. 3. | No. 4. |
|---|---|---|---|---|
| Weight of tank .. | 57 lbs. | 54.5 lbs. | 57 lbs. | 54.5 lbs. |
| Capacity of tank | 29 galls. | 29 galls. | 29 galls. | 28.8 galls. |
| Weight per gallon capacity .. | 1.96 lbs. | 1.88 lbs. | 1.96 lbs. | 1.89 lbs. |
| Shape of tank .. | cubical. | — | — | — |

*Imber Anti-Fire Tanks, Ltd.*

| | | | | |
|---|---|---|---|---|
| Weight of tank .. | 52.5 lbs. | 51.5 lbs. | 50.5 lbs. | 51.5 lbs. |
| Capacity of tank | 30 galls. | 29.7 galls. | 29.7 galls. | 29.5 galls. |
| Weight per gallon capacity .. | 1.75 lbs. | 1.73 lbs. | 1.70 lbs. | 1.75 lbs. |
| Shape of tank .. | elliptical. | — | — | — |

*Comdr. Boothby.*

| | | | | |
|---|---|---|---|---|
| Weight of tank .. | 36.5 lbs. | 35.5 lbs. | 33 lbs. | 35.5 lbs. |
| Capacity of tank | 31.5 galls. | 31.5 galls. | 31.5 galls. | 31.5 galls. |
| Weight per gallon capacity .. | 1.16 lbs. | 1.13 lbs. | 1.05 lbs. | 1.13 lbs. |
| Shape of tank .. | cubical. | — | — | — |

The method of testing the tanks in the preliminary trials was as follows :—

Each tank was mounted in a wooden structure similar in construction to the fore part of the ordinary tractor small-type aircraft. The concrete body formed to represent an engine was mounted in front of the tank. The structure containing tank and engine was released down an "I" section girder runway approximately 100 ft. high, so arranged that the body struck the ground at an angle of approximately 45° to the horizontal. It was originally intended to crash the structure on a concrete bed. It was, however, found necessary to modify the conditions, and the bed was covered with a 2 ft. 6 in. depth of sand. The conditions, then, briefly, were those of the typical aircraft crash, the engine partially burying itself, the tanks coming into violent contact with the engine. As, however, the *fuselage* structure at the moment of impact had attained a velocity—allowing for friction and air resistance—of approximately 50 m.p.h., the conditions were more severe than would prevail in a crash from which a human being could hope to escape with his life.

In the final trials the following tests were imposed :—

Two tanks of each type were submitted to acceleration and crashing tests, and the remaining two to firing tests, the acceleration test being arranged to imposed stresses approximately equivalent to four times that due to gravity.

The tanks mounted in the *fuselage* structure were fixed to a pendulum raised to the requisite height and released by a trip gear. A tank of each type submitted to this test was given two swings, and was then placed on one side for 10 to 15 minutes, at the end of which, from outside examination, nothing untoward had occurred.

The crashing tests were carried out in a similar manner to that adopted for the Preliminary tests, with the exception that flints were substituted for sand on the crashing bed.

The tanks submitted to firing test were mounted to their *fuselage* structures and subjected to bursts of five rounds of Vickers machine-gun fire, composed as follows :—one armour piercing, one incendiary, two armour piercing, one incendiary.

A system of judging was adopted whereby each judge was enabled to record an independent opinion on a common basis. For the preliminary tests this system was on the following basis :—

As regards weight, the basis of 100 marks was taken as representing a tank which, complete with fittings, conformed to the specified weight of 1.75 lbs. per gallon capacity.

For each variation of a decimal-point of this weight-capacity ratio, six marks were added or deducted from the 100 marks.

In addition, as a means of correction in the case of tanks whose capacity was outside stipulated limits, the following formula was adopted: $\frac{\text{Marks} \times \text{Required capacity}}{\text{Actual capacity.}}$

Tanks received marks for the attributes in the following proportion :—

(*a*) Crash-proof qualities, 100 marks maximum; (*b*) remaining attributes, 100 marks maximum.

(*b*) was divided up as follows :—

| | |
|---|---|
| Durability under Service conditions in the absence of accidents .. .. .. .. | 25 marks. |
| Indifference to extremes of temperature .. .. | 25 ,, |
| Adaptability of design to large capacities .. | 10 ,, |
| Simplicity of construction .. .. .. .. | 10 ,, |
| Adaptability of design to various shapes .. | 10 ,, |
| Accessibility of fittings .. .. .. .. | 10 ,, |
| Cost of production .. .. .. .. .. | 10 ,, |

In awarding marks for the various attributes stated above, the ordinary mild-steel Service tank was taken as a standard.

This resulted in the following competitors being placed in the order named at the end of the Preliminary Tests :—1st, Comdr. F. L. M. Boothby; 2nd, Messrs. Imber Anti-Fire Tanks, Ltd.; 3rd, India-Rubber, Gutta-Percha and Telegraph Works Co., Ltd.

In the final tests the marking was made on the following basis :—

100 marks maximum for each crash test, 100 marks maximum for each firing test and 100 marks maximum for remaining attributes—a total of 500 marks.

FLIGHT

# THE FRENCH 2,000,000 FRANCS ENGINE COMPETITION

## Extracts from the Regulations

IT is now several months since the announcement was first made of the intention of the French Committee for Aeronautical Propaganda to offer a prize of 1,000,000 francs for the "best" aero engine. Not long after this announcement it was stated that the French Under-Secretary of State for Air had decided to add another million francs in the form of two prizes of 300,000 francs each, the remaining 400,000 francs to be devoted to defraying the expenses of the competition. The regulations governing the competition have now been published, and below we give a *résumé* of some of the more important rules and regulations. For full particulars application should be made to *la Commission d'Aviation de l'Aero-Club de France, 35, Rue François—Ier, Paris.*

The competition will have for its object to encourage the production of an aero engine of "*grande endurance.*" The allocation of the prizes will be as follows:—Two prizes of 300,000 francs each, offered by the Under-Secretary of State for Air, to be awarded according to the national classification (which will be dealt with later). These two prizes are reserved for engines of French design and manufacture. The million francs prize offered by the Committee for Aeronautical Propaganda is to be devoted to purchasing, for the benefit of the French Government, the manufacturing rights of the engine classed first in the competition. This prize is open to the world, the only exception being ex-enemy countries. This engine is to be sold to the French Government for the relatively modest sum of one franc. Competitors will not be permitted to enter more than one engine of any type, nor several engines which are similar except for certain minor parts which, in the opinion of the judges, are accessories only. It will, however, be permissible to enter several engines of *different* types.

Entries must be sent in before December 1, 1922 (to *la Commission d'Aviation de l'Aero-Club de France*), each accompanied by an entrance fee of 20,000 francs in the case of French competitors and 10,000 francs in the case of foreign engines. By paying double fees, competitors may defer entries until December 1, 1923. In the case of foreign competitors the late entrance fee remains at 10,000 francs. Half of the entrance fees will be returned to competitors whose engines have passed the elimination tests. In the case of foreign competitors the entrance fee of 10,000 francs will be refunded to those who withdraw from the tests before March 1, 1924, the opening date of the competition.

Foreign competitors will be required to send in with their entries a written declaration to the effect that, in the event of their engine being classed first, they will hand it over, in running order, to the Committee for Aeronautical Propaganda on receipt of the amount of the prize. The delivery of the winning engine is to include a full set of working drawings, specification of the materials used and their heat treatment. The declaration specifies also that the French Government, or any company approved by the French Government, shall have the right to purchase for France, her colonies and protectorates, manufacturing rights (exclusive) with the following royalties: 8,000 francs per engine for the first 100, 7,000 francs per engine for the next 100 and 6,000 francs per engine for the third 100, and so on, decreasing by 1,000 francs per engine until the 601st engine, from which onwards there will be a fixed royalty of 2,000 francs per engine. If, after a period of two years, the total number of engines manufactured under licence does not amount to at least 200, the competitor has the right to cancel the agreement.

Each engine, in running order, must be delivered at the place where the competition is to be held (to be announced later) before March 1, 1924. It must be delivered in a sealed packing case, and competitors will not be allowed to remove engines from packing cases until just before mounting them on the test bench for acceptance tests.

The judges will number 10, half of whom will be nominated by the Under-Secretary and the other half by the Propaganda Committee. The judges' committee will be presided over by the Commission d'Aviation de l'Aero-Club de France, who will be in charge of the organisation of the competition.

### The Tests

Engines entered for the competition must be of the internal combustion type, and their nominal power is to be between 350 and 450 h.p. The weight for this power must not exceed 3.3 kg. (7.26 lbs.) per horse-power. This figure includes the engine and fuel and oil for five hours' flight, but not the weight of fuel and oil tanks. The speed of rotation of the airscrew must be less than $\frac{32,000}{\sqrt{\text{h.p.}}}$ r.p.m.

All engines are to be fitted with self-starters so as to avoid propeller swinging and hand starting, and this starter is to be used throughout the tests. By nominal horse-power will be understood the power which can be maintained by the engine at ground level for half an hour at a speed of $\frac{32,000}{\sqrt{\text{h.p.}}}$ r.p.m.

Engines will be required to undergo acceptance and eliminating trials, including a five hours' run on the test bench, driving the airscrew type of air brake which will be used in the endurance test, and a two hours' flying test in a machine provided by the competitor. During this test the machine must remain at an altitude of 2,000 metres for at least one hour.

### The Endurance Test

The engines which pass the eliminating trials will then be subjected to an endurance test of 240 hours' running in 30 periods of eight hours each. It is stipulated that the period for completing the endurance tests must not exceed 100 days. For the first half-hour of each eight-hour period the engine will be run at the number of revolutions corresponding to its normal power, and for the remaining seven and a half hours it will be throttled down to such power as the competitor considers it will maintain during the test. At the end of each eight-hour run competitors will have access to their engines for one hour. The mean power developed during the seven and a half hours' run will be referred to the power corresponding to a temperature of 15° C. and a pressure of 760 mm., assuming that the power increases in proportion to the pressure, and to the ratio $\frac{515}{500}t$ in which $t$ is the temperature in degrees Centigrade. The referred mean power thus found will determine the normal power of the engine during the tests, and should be equal to nine-tenths of the nominal power at least.

Marks will be awarded for certain features, which will be referred to later, and penalties will be imposed for delays, stops and replacements of parts. For a delay in starting each eight-hour run, if less than 15 minutes, a penalty of four points will be imposed; from 15 to 60 minutes' delay, eight points. A delay of more than one hour will result in the cancellation of the test. A stoppage during a test will be penalised by ten points, and further penalties will be imposed according to duration of stoppage, as follows: Less than 15 minutes, four points; 15 minutes to one hour, eight points. If the stop exceeds one hour the test will be cancelled.

The replacement of parts is mulcted according to the character of the part replaced. Thus the renewal of a sparking plug is penalised by four points; of a separate part or joint the replacement or repair of which can be carried out in one hour, and which leaves the engine in a state fit for further runs without tuning up, 10 points; of a part or joint which can be replaced or repaired in more than one hour, and which does not interfere with further running, 20 points.

For the renewal or replacement of a part or joint such that the engine cannot resume its series of eight-hour runs until it has been tuned up or a preliminary run made, 50 points will be put against an engine. The renewal of such parts as magneto, carburettor, ignition distributor, distributor or motor of self-starter, fuel or water pumps, etc., will be penalised by 75 points; while the replacement of such units as oil pump, complete cylinder, bank or group of cylinders, connecting rod complete with bushes, reduction gear, crankshaft or camshaft, crank-case, etc., will be penalised by 100 points. These penalties will also apply to replacements and repairs carried out during the hour preceding and that following an eight-hour run.

For parts or units replaced or repaired more than once the penalties will have a cumulative effect, the points given above being multiplied by the number of times the part or unit has been repaired or replaced. This does not, however, apply to sparking-plugs or valves, for which each fresh replacement will only be penalised at the unit rate—4 for the plugs and 10 or 20, according to whether the replacement takes less or more than one hour, for the valves.

It should be added that the cancellation of an eight-hour run will be penalised by 100 points, and that the cancellation of the endurance test altogether will follow as a result of: 10 eight-hour tests having been cancelled; of a number of replacements of those parts which were penalised by 100 points, as stated above, equalling or exceeding half the number of these components in each engine; of an interval of more than 30 days between two eight-hour runs; of the duration of the endurance tests exceeding 100 days. An

engine which has been withdrawn from the endurance tests for any of these reasons will be permitted another attempt, but will be penalised 500 points for so doing. The time limit for the second attempt will be 80 days, and not 100 days.

The fuel efficiency of an engine will be determined according to a formula, and five marks will be awarded for each gramme of petrol consumed per horse-power less than the 3 kg. allowed, while a penalty of five points per gramme more than the 3 kg. will be imposed. The use of a fuel with a flash-point above 35° C. will be awarded by 1,000 marks.

Penalties will be imposed for head resistance. The area of the convex contour into which the engine will fit, measured in square decimetres, will be taken (at right angles to the propeller axis), and the figure thus obtained will be multiplied by $\frac{400.}{\text{h.p.}}$ The result will determine the penalty.

The classification of the engines will be based upon the sum of all penalties incurred, less any marks awarded for low weight per horse-power, with five hours' fuel and oil.

The two prizes of 300,000 francs each, reserved for French engines, will be awarded as follows: One for the engine which shows up best in the summing-up of penalties and awards, and one for the engine which is adjudged best from the point of view of low weight and low air resistance.

# LONDON TERMINAL AERODROME

London, Monday evening, May 1.

NEW machines are now arriving at the air-station to augment the fleets of the various British companies in anticipation of the rush of summer traffic. On Friday, the second of the D.H.34's for the Instone Air Line arrived. This has the registration number G—EBBT, and conforms to the usual high standard of De Havilland finish. The first of the Instone D.H.34's is, by the way, still at Stag Lane undergoing modification.

On Saturday, the third of the Daimler Airway "34's" arrived. Mr. Herne, who piloted it over from Stag Lane, says that this machine cruises comfortably at 110 mile an hour, and is quite nice to handle. Each of these new "expresses" seems, in fact, to be a slight improvement on the last. Small folding tables are provided in front of each seat, so that the uniformed Daimler stewards can serve light refreshments during the air journey.

The Daimler Airways are now operating daily in each direction between London and Paris. This company have provided a complete installation for the rapid handling of engine repairs, and also for the changing of engines. This plant is, in fact, the first real attempt to keep machines constantly in the air, and to put into practice the theory that instead of ringing the changes on machines, the most practical way is to change engines.

### A Scheme with Far-reaching Possibilities

THIS engine-changing idea, if successful, will, it is hoped, put a completely new aspect on the question of long-distance airways, the same machine with its cargo undisturbed running for thousands of miles with a change of engines at various stages along the route, in a similar manner to railway practice on long distance journeys.

The plant has been erected in the temporary hangars, and is certainly the most costly piece of apparatus yet installed by any of the air-lines. A large four-legged derrick has been erected in the middle of the far end of one of the hangars in such a way that the nose of the machine can be run right under it, and have the engine lifted out by the derrick crane. The engine is then lowered to a truck which runs on a rail-track out of the hangar into the engine repair shop, the track continuing into the shed where the dynamometer for testing the engines has been erected. This means that the engine, after overhaul, can be tested before being placed in the machine, and then run straight to the derrick to be lifted into its place in the nose of one of the "34's."

Meanwhile, while the engine is being repaired, a spare engine is run under the derrick and lifted into place in the machine. The whole operation of changing the engine on a D.H.34, the engine installation of which was, of course, designed with this object in view, will, it is claimed, be completed in an almost incredibly short period of time.

### Instance of the Value of "Keep to the Right"

THE new regulations that the pilots' committee have recommended have now been put into operation tentatively, and in "dud" weather, pilots are sticking to the routes mapped out and keeping to the right of them. As an example of this, Mr. MacIntosh, while flying from Paris to London on Friday, in weather which was alternately good and bad owing to storms, passed no fewer than five "air expresses," British and foreign, travelling in the opposite direction, and all hugging the right of the scheduled routes.

While at times there have been more passengers than has been possible to accommodate, bookings have not, on the whole, been coming along as well as could be expected. In fact, it is doubtful if, on the month, the number of passengers carried has been up to last year's total for April. The French companies are the chief sufferers, and are attempting to build up their goods' services. There is going to be fierce competition this summer, when all the new flying stock is put on the services, and an intensive working of the various "air expresses" commences. Even the most optimistic estimates of passengers to be expected this season will fall far short of anything approaching full loads for every machine scheduled.

The Grands Express have had a consignment of 3½ tons of steel plates to carry by air from London to Paris, and are putting about half-a-ton on each of their outward-bound Goliaths. Another large consignment, obtained by the Grands Express, consisted of bales of knitting wool.

### The Schoolboys' Paris-London "Joy-Ride"

NINETEEN boys from the New College, Harrogate, who have been spending their Easter vacation in an organised tour of the continent, flew from Paris to London on Tuesday last. The first ten arrived in a Handley-Page o—400, piloted by Mr. MacIntosh, and had a long journey owing to the strong headwind. They were, however, delighted with the trip, and said it was all too short. The remaining nine travelled over in two D.H.18's, of the Instone Air Line.

The new Dutch pilots on the K.L.M. Amsterdam-London service have been piloting the monoplanes this week, and have managed to maintain the regularity of this service. The wind has been favourable for quick trips from London to Amsterdam practically throughout the week, and at the same time, has not made the return journey too long. In the cargo of one of these machines, en route for Holland, were several pairs of boxing-gloves, while there is a regular consignment of margarine from Holland.

### A Petrol Tankage of 27,000 Gallons

THE Shell-Mex people are putting in another two tanks, each with a capacity of 3,000 gallons, and erecting two more filling pumps. This addition will bring the total petrol storage on the aerodrome up to 27,000 gallons, while there will be eleven filling points. Six of these filling points are to be worked from a central pumping station, where an electric motor will work the pumps. This motor can be started and stopped from any one of the filling points.

Mr. MacIntosh had an exciting experience while approaching the air-station from Paris on the Napier-Bristol on Friday. Part of the engine cowling came loose and was flapping in the wind, and Mr. MacIntosh had to indulge in all sorts of gyrations in order to keep it reasonably close to the side of the machine. He had, in fact, great difficulty in landing.

### 1,000 Miles in a Day on Paris "Airway"

TO-DAY (Monday), the Daimler Airways are inaugurating their early morning service and apparently intend to commence their two journeys a day with each machine. Capt. Herne left on one of the D.H.34's at 6.55 a.m. and was back at the Air Station at 11.54 a.m. After lunch, he left at 12.45 p.m. on his second journey with the same machine, and arrived back at 5.40 p.m., having flown approximately 1,000 miles in the day, and having been actually piloting for 8 hours 52 minutes.

The Grands Express have altered the time of the departure of their service from London from 11.30 a.m. to 2 p.m. The time of the service from Paris remains unaltered.

Capt. Muir, of the Surrey Flying Services, tells me that his firm have now arranged with Basil Foster, Ltd., to rent an office in that company's building, but that Basil Foster, Ltd., will still act as booking agents for the Flying Services.

Mr. Uwins was at the aerodrome over the week-end to test the Bristol ten-seater, which Handley-Page pilots have, apparently, had some trouble in getting "unstuck" when carrying full load. Mr. Uwins, however, took the machine off in 175 yards with full petrol, 9 passengers, and a mechanic, in addition to 350 pounds of goods. All new types of machines require practice before they can be got off with ease with full load, but after a little experience, the airway pilots have no difficulty in taking the load specified by the makers.

The Royal Aero Club Avros have been in great demand this week, and two of them went to Henley on Sunday, returning to Croydon after dark, and landing with the aid of the night-lighting equipment.

FLIGHT
AIRCRAFT ENGINEER AIRSHIPS

# THE ROYAL AIR FORCE

*London Gazette, April 21, 1922*

*General Duties Branch.*

Flight-Lieut. A. H. Wann is placed on half-pay, Scale A; April 13.

*London Gazette, April 25, 1922*

*General Duties Branch*

The following are restored to full pay from half pay: Flight-Lieut. H. G. Bowen; April 17. Flying Officer E. Burton; April 1.

Wing Commander G. T. Brierley, C.M.G., D.S.O. (Lieut.-Col. R. A.), relinquishes his temp. commn. on return to Army duty; April 1. The short service commission of Pilot Officer A. T. Chapman is terminated on cessation of duty; April 26. Flight-Lieut. E. M. Pizey relinquishes his short service commission on account of ill-health contracted in the Service, and is permitted to retain the rank of Capt.; April 25.

*Stores Branch*

F. M. Gingold is granted a short service commission for three years on the active list as a Flying Officer, with effect from, and with seniority of, April 1. Flying Officer A. H. Scaife is granted a permanent commission, in the rank stated, with effect from September 12, 1919, and is transferred to the Stores Branch for Accountant duties, with effect from November 1, 1921 (*Gazette* September 12, 1919, appointing him to a short service commission, is cancelled). R. W. L. Glenn is granted a permanent commission as a Pilot Officer for Accountant duties; April 14, 1921 (substituted for *Gazette*, May 3, 1921).

The following are granted short service commissions, in the ranks stated, for Accountant duties, with effect from the dates indicated (substituted for *Gazettes* of dates indicated in brackets):—

*Flight-Lieut.*—E. W. Gregory, April 11, 1921 (May 3, 1921).

*Flying Officers.*—F. W. Arthurton, March 5, 1921 (March 15, 1921); J. R., Bond, March 5, 1921 (March 15, 1921); R. C. Clayton, May 9, 1921 (May 31, 1921); W. W. Deane, April 11, 1921 (May 3, 1921); J. F. R. Eales, White May 10, 1921 (May 31, 1921); S. C. Gibbs, April, 11, 1921 (May 3, 1921) O. K. Griffin, March 5, 1921 (March 15, 1921); A. B. Holt, January 15, 1921 (February 4, 1921); E. W. Horncastle, April 11, 1921 (May 3, 1921); E.V. Humphrey, January 15, 1921 (February 4, 1921); E. C. M. Knott, January 15, 1921 (February 4, 1921); L. de L. Leder, April 11, 1921 (May 3, 1921); K. R. Money, O.B.E., April 11, 1921 (May 3, 1921); A. L. Palmer, April 11, 1921 (May 3, 1921); C. G. Prior, March 5, 1921 (March 15, 1921); R. D. Robbins, April 11, 1921 (May 3, 1921); C. W. Rogers, March 5, 1921 (March 15, 1921); R. E. Steggall, M.B.E., March 5, 1921 (March 22, 1921); E. J. Stokoe, May 9, 1921 (May 31, 1921); A. D. Stonehouse, January 15, 1921 (February 4, 1921); C. E. Treadgold, January 15, 1921 (February 4, 1921); W. A. Wadley, March 5, 1921 (March 15, 1921); F. H. Wakeford, March 5, 1921 (March 15, 1921).

*Pilot Officers (since promoted).*—B. L. Blofeld, April 11, 1921 (May 3, 1921); J. W. Gray, January 15, 1921 (February 4, 1921); F. O. Hall, January 15, 1921 (February 4, 1921); H. A. Murton, April 11, 1921 (May 3, 1921); B. C. Powell, January 15, 1921 (February 4, 1921).

The following Pilot Officers on probation are confirmed in rank and promoted Flying Officers (December 22, 1921):—M. H. Luker, C. W. Price, A. C. Pritchard, D. J. Sherlock; Pilot Officer B. L. Bloefeld to be Flying Officer; December 22, 1921.

The following are confirmed in rank; December 22, 1921.

*Flight Lieuts.*—W. H. Hoile, M.B.E., R. D. Ward-James, I. L. Wincer.

*Flyng Officers.*—J. L. Armstrong, S. H. Atherley, J. C. Brice, H. W. Capener, J. H. B. Carson, P. D. Chisholm-Taylor, J. C. Christian, M.C., R. G. Dyer, E. K.Greenhow, M.C., D. C. Gribble, W. J. Heneghan, G. W. Lynn, J. J. T. Rose, F. J. S. Short, F. L. Wood.

The seniority of officers granted commissions in the Stores Branch for Accountant dutes is provisional only. The final seniority of all such officers will be promulgated when the establishment is completed.

The short service commission of Flying Officer E. G. Jolliffe is terminated on cessation of duty; April 7.

*Medical Service*

Flying Officer J. A. Perdrau, M.D., to be Flight-Lieut.; April 1. Flight-Lieut. H. C. E. Quin, D.P.H., relinquishes his temp. commission, and is permitted to retain rank of Capt.; April 8.

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# ROYAL AIR FORCE INTELLIGENCE

**Appointments.**—The following appointments in the Royal Air Force are notified:—

*Group Captains.*—C. S. Burnett, C.B.E., D.S.O., from No. 29 Group Headquarters (Coastal Area) to command R.A.F. Base, Leuchars (Coastal Area) on disbandment of No. 29 Group Headquarters. 1.4.22. E. F. Briggs, D.S.O., O.B.E., from Air Ministry (Director General of Supply and Research) to R.A.F. Depôt (Inland Area) (Supernumerary). Pending embarkation overseas. 22.5.22. R. Gordon, C.B., C.M.G., D.S.O., from Headquarters, R.A.F., Middle East, to command R.A.F., Trans-Jordania Headquarters. 1.4.22. N. J. Roche, O.B.E., from R.A.F. Depôt (Inland Area) to Headquarters, R.A.F., Iraq, as Principal Medical Officer. 13.4.22.

*Wing Commanders.*—H. M. Cave-Browne-Cave, D.S.O., D.F.C., from No. 1 School of Technical Training (Boys) (Halton) to Air Ministry (Director General of Supply and Research). For Technical Staff duties *vice* Group Captain E. F. Briggs, D.S.O., O.B.E. 22.5.22. H. A. Williamson, C.M.G., A.F.C., from R.A.F. Depôt (Inland Area) to Half-pay List. 3.4.22. R. G. D. Small, from Half-pay List to R.A.F. Depôt (Inland Area). 14.3.22. And to No. 10 Group Headquarters (Coastal Area). 1.5.22. S. Grant-Dalton, D.S.O., A.F.C., from No. 29 Group Headquarters (Coastal Area) to R.A.F. Base, Leuchars (Coastal Area) (Supernumerary). 1.4.22. And to Air Ministry (Director of Personnel). 1.5.22. R. H. Verney, O.B.E., from Boys' Wing, Cranwell, to No. 1 School of Technical Training (Boys) (Halton). 1.5.22. H. R. Nicholl, O.B.E., from Headquarters (Inland Area) to No. 7 Group Headquarters (Inland Area). 10.4.22. A. T. Whitelock from R.A.F. Depôt (Inland Area) to No. 1 School of Technical Training (Boys) (Halton). 1.5.22. W. L. Welsh, D.S.C., A.F.C., from R.A.F. Depôt (Inland Area) to No. 1 Group Headquarters (Inland Area). 1.6.22. H. L. Reilly, D.S.O., from School of Technical Training (Men) (Inland Area) to No. 7 Group Headquarters (Inland Area). 15.4.22. D. L. Allen, A.F.C., from No. 8 Squadron (Iraq Group) to R.A.F. Depôt (Inland Area) (Supernumerary). 1.2.22. T. O'Brien Hubbard, M.C., A.F.C., from No. 4 Flying Training School (Middle East) to R.A.F., Trans-Jordania Headquarters (Middle East). 10.4.22. M. G. Christie, C.M.G., D.S.O., M.C., from Air Ministry (Director of Operations and Intelligence) to British Embassy, Washington, as Air Attaché. 15.4.22. G. I. Carmichael, D.S.O., A.F.C., from Palestine Group Headquarters (Middle East), to Command Palestine Wing Headquarters (Middle East). 1.4.22.

*Squadron Leaders*—E. L. Conran, M.C., from Half-pay List to No. 7 Group Headquarters (Inland Area). 13.4.22. A. B. Gaskell, D.S.C., from No. 29 Group Headquarters (Coastal Area) to R.A.F. Base, Leuchars (Coastal Area) (Supernumerary). 1.4.22. N. M. Martin, C.B.E., from No. 29 Group Headquarters (Coastal Area) to Care and Maintenance Party, Donibristle (Coastal Area) (Supernumerary). 1.4.22. L. D. D. McKean, from No. 203 Squadron (Coastal Area) to R.A.F. Base, Gosport (Development Flight) (Coastal Area). 25.4.22. W. B. Cushion from No. 29 Group Headquarters (Coastal Area) to Care and Maintenance Party, Donibristle (Coastal Area) (Supernumerary). 1.4.22. E. J. Sayer, M.C., from Headquarters, R.A.F., India, to R.A.F. Depôt (Inland Area) (Supernumerary). 11.3.22. E. J. Sayer, M.C., from R.A.F. Depôt (Inland Area) to command the Packing Depôt (Inland Area). 8.5.22. W. R. Read, M.C., D.F.C., A.F.C., from R.A.F. Depôt (Inland Area) to R.A.F. Cadet College (Flying Wing), (Cranwell). 24.4.22. Hon. L. J. E. Twisleton-Wykeham-Fiennes, from Palestine Group Headquarters (Middle East), to Palestine Wing Headquarters (Middle East). 1.4.22. W. Thomas, M.C., from Central Flying School (Inland Area), to Boys' Wing (Cranwell). 28.4.22.

*Flight Lieutenants.*—(A. Sqr. Ldr.) F.C. Kempson, M.B., B.A., from No. 29 Group Headquarters (Coastal Area) to Care and Maintenance Party, Donibristle (Coastal Area) (Supernumerary). 1.4.22. A. N. Gallehawk, A.F.C., from No. 203 Squadron (Coastal Area) to R.A.F. Base, Leuchars (Coastal Area). 1.4.22. H. O. Barnaby, M.B.E., from No. 29 Group Headquarters (Coastal Area) to Care and Maintenance Party, Donibristle (Coastal Area) (Supernumerary). 1.4.22. S. E. Toomer, D.F.C., from Inspector of Recruiting (Birmingham) (Coastal Area) to No. 4 Squadron (Inland Area). 19.4.22. J. S. Goggin, from No. 29 Group Headquarters (Coastal Area) to R.A.F. Base, Leuchars (Supernumerary). 1.4.22. W. Sutherland, M.B.E., from No. 29 Group Headquarters (Coastal Area) to Care and Maintenance Party, Donibristle (Coastal Area) (Supernumerary). 1.4.22. T. Hinshelwood, D.S.C., D.F.C., from No. 1 Squadron (Iraq Group) to R.A.F. Depôt (Inland Area) (Supernumerary). 25.2.22. W. H. L. O'Neill, M.C., from No. 5 Squadron (India) to R.A.F. Depôt (Inland Area) (Supernumerary). 9.3.22. R. A. Young from Aircraft Depôt (India) to R.A.F. Depôt (Inland Area) (Supernumerary). 9.3.22. L. F. P. Bawn, from No. 1 Group Headquarters (Inland Area) to Inland Area Aircraft Depôt (Inland Area). 1.5.22. P. B. Hunter from Aircraft Depôt, Egypt (Middle East Area) to No. 208 Squadron (Middle East Area). 18.3.22. M. H. Butler, D.F.C., from Inland Area Aircraft Depôt (Inland Area) to No. 11 Wing Headquarters (Inland Area) (Supernumerary). 13.4.22. N. R. Fuller, from Aircraft Park (India) to R.A.F. Depôt (Inland Area) (Supernumerary). 11.3.22. J. C. T. Fiddes, M.B., from R.A.F. Depôt (Inland Area) to No. 1 School of Technical Training (Boys) (Halton). 10.4.22. R. H. Wace, from Research Laboratory and Medical Officers School of Instruction (Inland Area) to No. 1 School of Technical Training (Boys) (Halton). 10.4.22. T. C. Thomson, from School of Photography (Inland Area) to Central Flying School (Inland Area) (Supernumerary). 18.4.22. A. H. Wann, from Headquarters, Coastal Area, to Half-pay List. 13.4.22. A. L. Lingard, from Aircraft Depôt, Egypt (Middle East Area) to R.A.F. Depôt (Inland Area) (Supernumerary). 30.3.22. D. Le Bas, from R.A.F. Depôt (Inland Area) to Central Flying School (Inland Area). 10.4.22. A. J. M. Ross, M.B.E., from No. 4 Flying Training School (Middle East) to Stores Depôt, Egypt. 10.4.22. A. C. Collier, from Inter-Allied Aeronautical Commission of Control (Hungary), to R.A.F. Depôt (Inland Area), (Supernumerary) on disbandment of I.A.A.C. of Control (Hungary). 21.4.22. R. Graham, D.S.O., D.S.C., D.F.C., from No. 60 Squadron (India) to Staff College, Quetta. 20.2.22. J. C. M. Hay, from Aeroplane Experimental Establishment (Coastal Area) to No. 216 Squadron (Middle East). 11.4.22. J. L. Vachell, M.C., from No. 27 Squadron (India) to Staff College, Quetta. 20.2.22. C. H. Awcock, O.B.E., from R.A.F. Depôt (Inland Area) to Electrical and Wireless School (Inland Area), (Supernumerary). 24.4.22. K. B. Lloyd, A. F. C., from No. 70 Squadron (Iraq Group) to Headquarters, Middle East Area (Supernumerary). 1.3.22. W. B. Higgins, to R.A.F. Depôt (Inland Area), (Supernumerary) on appointment to Short Service Commission for duty with Armoured Car Company (on formation). 18.4.22. W. J. King, D.C.M., from No. 1 Stores Depôt to Aircraft Park (India). 6.4.22. H. G. Bowen, from Half-pay List to R.A.F. Depôt (Inland Area), (Supernumerary). 17.4.22. H. O. Barnaby, M.B.E., from Care and Maintenance Party, Donibristle (Coastal Area) to R.A.F. Depôt (Inland Area, (Supernumerary). 15.5.22. C. Shoppee, D.S.C., from No. 10 Group, Headquarters (Coastal Area), to School of Naval Co-operation and Aerial Navigation (Coastal Area). (Supernumerary). 4.5.22. A. J. Nightingale, from Care and Maintenance Party, Donibristle (Coastal Area) to No. 10 Group, Headquarters (Coastal Area). 1.5.22. V. J. B. Jacobs, from Headquarters (Coastal Area) to Air Ministry (Directorate of Equipment). 15.6.22. A. H. Comfort, from Air Ministry (Directorate of Equipment) to R.A.F. Depôt (Inland Area), (Supernumerary). 15.6.22. A. B. Wiggin, from No. 1 Stores Depôt, to Air Ministry (Directorate of Equipment). 15.6.22. N. Keeble, D.S.C., D.F.C., from No. 6 Flying Training School (Inland Area), to School of Technical Training (Men), (Inland Area), (Supernumerary). 1.4.22. (*Note.*—Previous notice posting this officer to R.AF.. Depôt (Inland Area) on the same date is cancelled.) J. R. Howett, from No. 207 Squadron (Inland Area), to R.A.F. Depôt (Inland Area) (Supernumerary). 1.5.22. C. E. W. Lockyer, from R.A.F. Depôt (Inland Area), to No. 207 Squadron (Inland Area). 26.4.22. J. H. Simpson, from Palestine Group Headquarters (Middle East), to Palestine Wing Headquarters (Middle East) (Supernumerary). 1.4.22. K. H. Riversdale-Elliot, from Palestine Group Headquarters (Middle East), to Palestine Wing Headquarters (Middle East). (Supernumerary). Pending posting to No. 208 Squadron. 1.4.22. A. S. C. Maclaren, O.B.E., M.C., A.F.C., from No. 208 Squadron (Middle East), to command Aden Flight (Middle East). 1.4.22. S. N. Cole, from Palestine Group Headquarters (Middle East), to Palestine Wing Headquarters (Middle East) (Supernumerary). Pending embarkation to Iraq. 1.4.22. V. R. Gibbs, D.S.C., from Palestine Group Headquarters (Middle East), to Palestine Wing Headquarters (Middle East). 1.4.22. Wm. Burkinshaw, from Palestine Group Headquarters (Middle East), to Palestine Wing Headquarters (Middle East). 1.4.22.

# IN PARLIAMENT

**Civil Aviation**

MR. L'ESTRANGE MALONE, on April 27, asked the Secretary of State for Air whether he can make a statement in regard to the appointment of a Controller-General for civil aviation?

Capt. Guest: When introducing the Air Estimates on March 21, I said that it was my intention to re-organise the Department of Civil Aviation as a directorate. I am afraid I am not yet in a position to announce the name of the new Director.

Mr. Malone: Is the right hon. and gallant gentleman aware of the strong feeling, both in this country and the House, that enough is not being done for civil aviation; and can he say whether a day will be given for the discussion of this important matter?

Capt. Guest: That rests in the hands of the House.

Commander Bellairs: When the proposed re-organisation takes place, will care be taken that civil aviation is not made subordinate to the military aviation side?

Capt. Guest: Most certainly.

Mr. Raper: When the remaining Votes are taken, shall we be allowed a wide discussion upon them?

Mr. Malone: Is the right hon. and gallant gentleman aware that when the Air Estimates were discussed before, civil aviation was ruled out, and all discussion was precluded?

Capt. Guest: That was done intentionally, so that certain Votes might still be left for discussion.

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## 28th Squadron, R.F.C. and R.A.F.

THE half-annual function arranged by the 28th Squadron Old Boys' Association, was held at Eustace Miles' Restaurant, Chandos Street, on April 29. In accordance with precedent, ladies attended in good force, and the total muster was something in excess of 70, several of the Vice-Presidents who attended appearing to enjoy themselves. As is inevitable when old comrades meet, general greetings resulted in slight delay before the organised business could be opened; but the whist tables were in full working order soon after 7 o'clock. The short whist drive finished soon after 8 o'clock, and many willing hands cleared the floor so that the band (under the direction of two of the Association members), opened with a flourish and the first dance served as a fitting prelude to the refreshments interval. Internally refreshed, the company settled heartily down to the remaining part of the programme, dances being interspersed with concert items. Several prizes, presented by one of the Vice-Presidents, were awarded during the evening. The band and the Committee worked like Trojans, well earning the eulogies freely expressed. The usual Annual Reunion will be held in the autumn, and details will be circulated in the usual way. Meanwhile, past or present members of the 28th, who have not been in touch with the Secretary (Mr. C. T. Hodges) are requested to write to him at 102, Camden Street, N.W. 1.

## Guynemer Memorial

LAST WEEK the Memorial tablet to Capt. Guynemer, the famous French "ace", was formally inaugurated in the Paris Pantheon, M. Poincaré making an eloquent speech upon the occasion.

## Holland and Aviation Subsidy

ON April 28 a Bill was introduced into the Second Chamber to grant the Royal Dutch Air Service an extra subsidy of 22,000 florins for 1921, and 420,000 florins for 1922. It is stated that it is practically certain that the subsidies will be voted in order to keep the air service alive, as without these subsidies it will be impossible for the company to continue after the spring.

## Seaplane Floating Dock Ready

IT is announced that the seaplane floating dock, previously referred to in FLIGHT, which has been under construction at Sheerness Dockyard to the orders of the Air Ministry, has now been delivered as ready for service. For the present, the craft has been berthed in the Medway, near Port Victoria. The dock, which has an overall length of 143 ft., and a lifting capacity of 200 tons, will accommodate two large modern seaplanes, has thirteen buoyancy compartments, each flooded direct from the sea and emptied by blowing with compressed air. The power for the air compressors is supplied by two oil-driven dynamos, which also provide the current for lighting and power for workshop machinery, capstans, winches, and pumps. An interesting feature is the supply of petrol to seaplanes from a large storage tank on the deck by means of the Bywater hydraulic system.

## Franco-Roumanian Extension

THE Franco-Roumanian Air Navigation Co., which has been running an air service from Paris to Prague and Warsaw, is now about to inaugurate an extension of their service from Prague to Vienna and Buda Pest. The new service is to run three times a week, and the time taken will be two hours from Prague to Vienna and about 1¾ hours from Vienna to Buda Pest.

## PUBLICATIONS RECEIVED

*Problems et Exercices d'Electricite Generale.* By P. Janet. Paris: Gauthier-Villars et Cie., 55, Quai des Grands-Augustins.

*"Bristol"* Gas Starter. The Bristol Aeroplane Co., Ltd., Filton, Bristol.

*British Standard Aircraft Specifications*:—3 W.2, Flexible Steel Wire Rope; D.33, Dope and Varnish Removers; 2 D.103, Air Ministry Nitro Dope Coverings and Identification Colours; 2 L.4, Hard Aluminium Sheets; 2 L.16, Half-Hard Aluminium Sheets; 2 L.17, Soft Aluminium Sheets; L.25, Wrought Light Aluminium Alloy Bar ("Y" Alloy); L.26, Wrought Light Aluminium Alloy Sheets ("Y" Alloy). British Engineering Standards Association, 28, Victoria Street, London, S.W. 1.

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## AERONAUTICAL PATENT SPECIFICATIONS

*Abbreviations:* cyl. = cylinder; I.C. = internal combustion; m. = motors
The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

**APPLIED FOR IN 1920**

*Published April 20, 1922*

27,281. J. N. CHRISSOVELONI. Aerial machines. (177,186.)
35,913. N. F. JOHNSTON. Rotary engines. (177,248.)
35,916. B. A. DUNCAN. Connecting means for aircraft framework. (177,249.)
35,918. B. A. DUNCAN. Control surfaces of aircraft. (177,250.)

*Published April 27, 1922*

33,323. B. G. TEXTILWERKE GES., W. E. DORR and W. MULLER. Rigid airships. (154,225.)

*Published May 4, 1922*

30,994. W. H. BARLING. Aircraft *fuselages*, etc. (154,576.)
34,571. SOC. DES MOTEURS GNOME ET RHONE. I.C. engines. (156,578.)

**APPLIED FOR IN 1921**

*Published April 20, 1922*

1,445. J. B. WOOD. Rotary engines. (177,286.)
4,583. G. FORNACA. Propulsion of aircraft. (177,340.)
9,310. SOC. ANON. DES AEROPLANES G. VOISIN. Lubrication of I.C. engines. (161,940.)

*Published April 27, 1922*

4,732. ARMSTRONG-SIDDELEY MOTORS, LTD., and F. M. GREEN. Rudder control mechanism for twin-engined aeroplanes, etc. (177,659.)
9,008. R. A. PEGLAR. Flying-machines. (177,702.)
9,244. A. H. HARRIS. Rotary I.C. engines. (177,705.)
17,252. R. ESNAULT-PELTERIE. Means for synchronising moving parts of direct-acting fluid-pressure motors and pumps. (167,746.)

*Published May 4, 1922*

2,595. G. W. DUCHEMIN. Aeroplane propeller making machines. (177,905.)
3,897. I. HATANO. Pilot seats for aeroplanes. (177,922.)

**Secret Patents re-Assigned to the Inventor.**

*Published April 27, 1922*

**APPLIED FOR IN 1916**

3,129. H. E. WIMPERIS. Director apparatus for aircraft. (177,548.)

**APPLIED FOR IN 1918**

4,482. H. E. WIMPERIS. Sighting-devices for use on aircraft. (177,549.)



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